UNIVERSITAT JAUME·I

Correlation between GDP mortgages and loans: the European case

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0- Abstract

The aim of the study is to investigate potential correlations between loans to firms or to households and the GDP of the main UE countries. The main idea concerns the possibility to design some new economic indicators which could be useful in predicting a crisis.

Following a recent study of the European Central Bank I analyzed loans and mortgages in order to understand if their movements anticipate or follow the movements of GDP.

The results I obtained are in line with the study of the ECB, showing that, in general, mortgages to households tend to anticipate GDP variations while loans to firm tend to follow. Moreover, I analyze the explanation of the EBC, and I add some more elements in order to understand the results of the study.

I finally conclude that the analysis of loans and mortgages dynamics could give some relevant insights for building new indicators in order to prevent future crises.

1- Introduction

In this work, I am going to try to analyze the macroeconomic factors such as economic indicators and their way of acting and affecting these. As main factors, monetary aggregates, loans granted to households, loans granted to enterprises and GDP will be analysed.

Firstly, the role of monetary aggregates, and the evolution of them in recent years and its interpretation of the ECB as well as its correlation with GDP and economic roles will be also explained.

After, it will be shown the vision that the ECB has on the main theme of the work that is the correlation with loans granted to families as an early indicator of the GDP, and the GDP as a preliminary indicator on loans granted to businesses.

Following this, real data has been extracted from the ECB and other institutions from

each analysed country, to carry out an individual examination of the indicators mentioned above, by several countries individually, and in conjunction with the European Union, in order to see the contrast obtained and displayed by the ECB study.

Afterwards, the impact on the economies of the countries will be analysed, the fact of these correlations and the delay differences that exists between them will be explained.

Finally, the conclusions drawn from the analysis of the obtained data and the obtained comparison will be exposed to make if the results have been matched. The kind of impact this study has and how to deepen it will also be explained.

Therefore, the aim of this paper is to analyse the loans granted to families as a prior indicator to the evolution of GDP, which would be a major advance to come forward to possible crisis or recessions both in long-term and current or potential, and to take steps to ensure that its effect is less, and use this indicator in conjunction with the current used, which is the evolution of the inflation rate.

Additionally my motivation for choosing this job was the opportunity to contribute to the study and discovery of new macroeconomic indicators for economic sustainability.

2- The evolution of monetary aggregates

2.1 Before the crisis

Monetary aggregates are the sum of currency within an economy plus the outstanding amount of certain liabilities of financial institutions, which have a high degree of liquidity and its main components of the monetary aggregates are the M1, which corresponds to the money that is used for transactions, to sell and buy things. This money can be used at any time; in other words, it is liquid. To be clear, it refers to the cash (coins and banknotes) that is held by the public and to the current account deposits in banks, which are transferable by check.

The M2 corresponds to the money in a broader sense. M2 is the sum of the elements

of M1 and financial instruments that can be considered as very close substitutes money. They are: deposits or savings accounts and time deposit certificates (CDTs).

While the M3 consists of M2, term deposits and other bank liabilities. In the latter, repurchase agreements, money market funds and securities which are not shares and have a maturity of up to two years.

Regarding its performance on the economy before the crisis, that, on the one hand, with the business activity of the financial sector in an environment of deregulation and, on the other hand, the laxity of monetary policies together with some of their characteristics ways of performance of the banking system was the main reasons for the great crisis of 2007.

The governments of the last few decades are responsible for having developed a long process of deregulation, justified by the belief about the ability markets have to self-regulate. But they were not the sources of the crisis, whose ultimate responsibility lies with the financial institutions.

The lower interest rates and deregulation were an important factor, but the business practices of financial institutions, together with the ambition of the profit maximization, led to the excesses that enhanced the financial crisis.

Furthermore, the abundant availability of quick loans, by itself, does not create problems. Along with this, the deregulation of the financial industry allowed: a) an aggressive mortgage commercialisation, encouraged by perverse commercial incentives, focused excessively on short-term results, b) the irrational belief on the buyers part, but also on part of some of the major international economic authorities that such housing prices could not fall, c) marketing of new financial derivative products, difficult to understand (while this is not the problem), providing incomplete information about its features, together with d) an assessment of the very deficient risk by rating agencies.

That is, a set of appropriate factors was given to generate an excessive indebtedness by consumers with low loan quality. But for this to occur, the financial institutions themselves should decide to grant such loans. And they must be willing to take an excessive risk concentration in the housing sector in satisfying the high demand for loans. As well as raising their inactivity in the financial derivatives that were creating

excessive levels, in part due to the deregulation of investment banking.

Governments reacted clearly on the lines I have already stated before, providing liquidity in the system, in the widespread conviction that the 1929 depression was caused or aggravated at least in part by a restrictive monetary policy. This was learned properly and an appropriate treatment has been applied. But some errors in the process have also been appreciated, which should generate lessons for the future. Apart from the deregulatory and low interest rates context, it might be useful to check the main errors before the outbreak of the crisis and during the treatment of the same: the existence of clear monitoring failures, possibly supported in two beliefs that the ability of financial markets to self-regulate themselves would prevent the existence of malpractice, nor economic authority or supervisory bodies explained in a sufficiently informative way to potential home buyers the possible development of the their mortgage debt service.

Mortgages were contracted at a level of unsustainable exchange medium and long term interest rates, which ensured a rise in mortgage debt service, the tardiness of the authorities to recognize the existence of a systematic crisis, in front of a limited crisis to a few entities due to very specific features, the difficulty in identifying if we were facing a liquidity crisis or a solvency crisis.

In essence, the crisis was caused by a market failure, consisting of a set of perverse incentives, favored by a deregulatory context and excessive permissiveness supervisor, together with a very loose monetary policy.

Since the monetary policy that establishes the ECB is based on the price stability by using two basic pillars, money and price forecasts, using, so far, as the main indicator of price changes in the inflation rate. To achieve this stabilization, the most frequent measurements are shown in the following table:

They are monetary policies that have kept the rate of inflation at historically low levels in the major developed economic zones. Low interest rates make a cheap indebtedness, at the same time that secure saving remuneration, like certificates of deposit, bank deposits and treasury bills, decrease. Consequently, indebtedness increases and savings decreases.

But these loan facilities with countless times without assessing the risk and open with less control and demand a weaker market stocks, have led to the generation of toxic assets and ease of transmission worldwide not only generating crisis where they were made, but also in the rest countries that dealt with it financially, and in turn, the third countries dealing with them creating a worldwide network of global financial toxicity with various affectations in measurements of the amount of those assets and of the economic characteristics and measures taken by countries having happened that.

The budget savings encourages homeownership; as the supply of these cannot be adjusted in short term, the greater demand raises the price. Low interest rates also stimulate the economy through consumer spending and investment, and tend to raise stock prices, making the transition to a higher position in the small savers' billfolds, both for the greater acceptance of risk and for the best expectations of future enterprise

profits.

Loan demand is fulfilled by financial intermediaries, in large part commercial banks, that have to borrow in turn, and that base their business on the interest rate differential spread to borrowers and lenders. In general, this has the effect of providing assurance to people or institutions that borrow and assume some risk in granting loans. The simplest way to achieve this is to borrow in the short term and to lend in the long term. The increased liquidity allows the access to a lower rate of interest on loans; on the contrary, the largest term providing means less liquidity and greater risk of something happening that endangers the return of loans, and both effects make a higher long-term interest rate. Banking activity is inherently risky.

This is why best indicators for both evaluation of loan risk and forecast future price stabilization and thus of the economy are needed. For that reason, the factor of loans granted to enterprises such as indicator will be further shown.

2.2 During and after the crisis

When, in the summer of 2007, the first signs of the impending economic crisis were felt, few were those who ventured the central role that this would acquire both for fiscal policy and for monetary policy in managing it.

Already in the G-20 meeting that took place on November, 2008 in Washington, the idea of a joint response to the crisis was launched, and within it, the use of fiscal measures to quickly stimulate domestic demand and in the more appropriate way each country considers, while maintaining fiscal sustainability.

Following this statement, as well as fiscal measures already taken by some EU countries, the European Council, at its meeting in December 2008 in order to strengthen the aggregate demand and to advance the implementation of structural reforms, approved the so-called European Economic Recovery Plan. In it, it was agreed to address an immediate budgetary impulse amounting to EUR 200,000 million (1.5% of EU GDP), consisting of a budgetary expansion by Member States of EUR 170 000 million (about 1, 2% of EU GDP) and EU funding in support of immediate action for an amount of EUR 30,000 million by (around 0.3% of GDP).

Both the G-20 and the approved Plan by the Union, the central importance of the coordination of national policies was demonstrated. If the crisis is global, it requires a global solution. Moreover, in open economies, part of the fiscal stimulus is transferred to foreign trade, and if the answer is concerted, the trade flows in all directions will increase.

In the decision of the Council, some criteria for national fiscal stimulus were also set. Specifically, to be effective, it requires that the measures envisaged are: timely, targeted and temporary. Besides, it is advocated to address to the root of the problems, which do not relate to political commitments, and do not distort the behavior of private agents or involve a misallocation of resources.

On the other hand, given that these stimulus packages cause an increase of deficits and debt, they erode sustainability of public finances in the medium and long term, which can cause companies and households reduce their consumption in anticipation of future tax payment (the famous Ricardian equivalence). That is, there is a tangible risk of deterioration of the future sustainability of public finances. In this respect, the Commission has made particular emphasis on the reversibility of measures (the appearance of the "temporary"), not to suppose ballast, from which is hard to let go once the recession has passed.

Although in many countries these expansionary fiscal policy measures were not carried out as they should, and their effect was in a very short term aggravating even more the situation by having an even greater deficit and public debt of more thickness as in the case of Spain.

Some examples of these national programs are: in the case of Germany, which had previously adopted a package of measures for an amount equivalent to 1.3% of GDP (2009 and 2010), approved a second stimulus plan in January 2009, called "Pact for Employment and Stability in Germany: Safeguards Jobs, Strengthening the Forces of Growth and Modernizing the Economy", about 2% of GDP, also for the biennium.

In the case of France, also approved two packages: the first, in late 2008, amounted to 1.5% of GDP for 2009-2011, and the second, in February this year, an additional 0.4%.

In Italy, the measures taken by Italy, approved in November 2008, are more modest than those of the other important members of the EU (possibly due to its huge public debt), to the extent that the Council of the Union itself, not considers as expansive, but neutral. Equivalent to 0.5% of GDP for 2009-2010.

In Spain, the government approved in November 2008 the so-called "Spanish Stimulus Plan for Economy and Employment", focusing on the expenditure side, representing in aggregate more than 3% of GDP for 2008-2010 .

And on the UK's behalf, in November 2008, a fiscal stimulus package was approved by an amount equal to 0.25% of GDP for 2008 and 1.5% for 2009.

After a few years of continued implementation of these measures and transitional stage in the crisis, the situation has been improving since August 2013, when M3 growth is positive, but in general, the monetary dynamics was aggravated. The annual growth in money supply was mainly supported by continued inflows of net capital in the EU and the reduction of financial liabilities in the longer term.

The annual growth rate of M3 increased slightly to 2.3% in August 2013, from 2.2% in July, after falling for three consecutive months.

In terms of components, M1 remained being the largest contributor to the growth of M3. The contribution from the others short-term factors as would the difference M2 and M1, that diminished to be nearly zero, while the share of marketable instruments which are the difference between M3 and M2 ,continuous with a high negative trend. Regarding the M1, these developments continue reflecting the low opportunity costs of the development of the most liquid instruments.

For M3 minus M1, it serves to denote a constant search for performance by the money-holding sector, higher rates of return assets in M3 towards a lower liquidity.

As regards to the counterpart, the creation of money was again supported by an increase in MFI network, in terms of foreign assets as a result of net inflows in the current euro area. On the other part, outflows of financial liabilities in the longer term, in particular, net redemptions of MFI longer-term debt securities, also supported M3 growth.

On the contrary, significant net repayments of loans granted to the private sector, made which stopped the positive aspect of the creation of money. Causing that the volume of the main assets of the euro area of the MFI was more contracted in August, to continuing with the deleveraging observed since the second quarter of 2012.

Another favorable factor was the reduction of the possession of debt securities issued by MFIs, and to a lesser extent, by net repayments on loans granted to the private sector and loans from MFIs.

By contrast, the fact that MFI had big debt securities was a negative factor due to the dependence of the euro area on MFIs in the Eurosystem liquidity, but this benefit was decreasing with a downward trend observed since August 2012.

The chart below shows the evolution of monetary aggregates:

The previously mentioned is shown in the above graph, that during early SXXI monetary aggregates have grown considerably with some fluctuations, thanks to the freedoms gotten in the financial market and the ease of mobility of toxic assets, showing the great effect of the decrease in the 2007 crisis both for the output of large capital outflows from Europe and for the decreasing values of financial instruments that were on the market during these years.

Then, with the measures taken by the ECB and implanting them to national BC, has promoted a slight improvement in the overall result but not in all countries. Nevertheless, it can be seen again how in mid-2012 is being returned to diminish due to the policies after the crisis of an expansionary fiscal policy by increasing government spending and promoting certain assets, has resulted, in the medium term, a large increase in both deficit and public debt in many countries, together with the insecurities created in homes when investing.

Some moderation in the growth of M3 deposits held by households with a strong monthly income for deposits for the sector, and the outputs of M3 deposits intermediaries other than insurance and funds pensions (OIF) Financing non-monetary has that generated annual growth in 2012 of M3 deposits has been declining.

And a significant monthly income of M3 deposits held by non-financial corporations, could not prevent their growth slightly reduced.

The annual growth rates of M3 deposits remained heterogeneous nationally in August, but improvements could be seen especially in Spain and Italy.

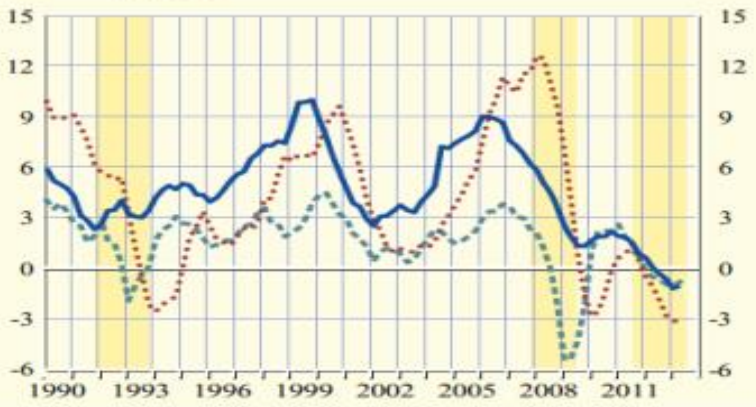
In general, the low remuneration of short-term deposits other than overnight deposits, negotiable instruments and reduced risk aversion of investors has led the money-holding sector to transfer funds from underperforming assets to assets riskier outside M3, looking for higher returns. This has been visible in the increase in household investment in equity and bond funds in early 2013 and more recently.

3- Prior explanation of ECB

In terms of macroeconomic indicators, the European Central Bank seeks again the inclusion a part from the principal, which is the evolution of the inflation rate, monetary aggregates, loans granted to households and loans granted to enterprises are among the analyzed to complement the inflation rate.

Chart C Real household loan growth, real non-financial corporation loan growth and real GDP growth

(annual percentage changes)



Sources: ECB, Eurostat and Centre for Economic Policy Research (CEPR).
Notes: The latest observation is for the second quarter of 2013. Shaded areas delimit recessions according to the chronology of the CEPR Business Cycle Dating Committee for the euro area. Real series have been derived by deflating nominal series with the GDP deflator.

This chart show how the GDP, loans granted to households and business are related at a general level of media data from the European Union.

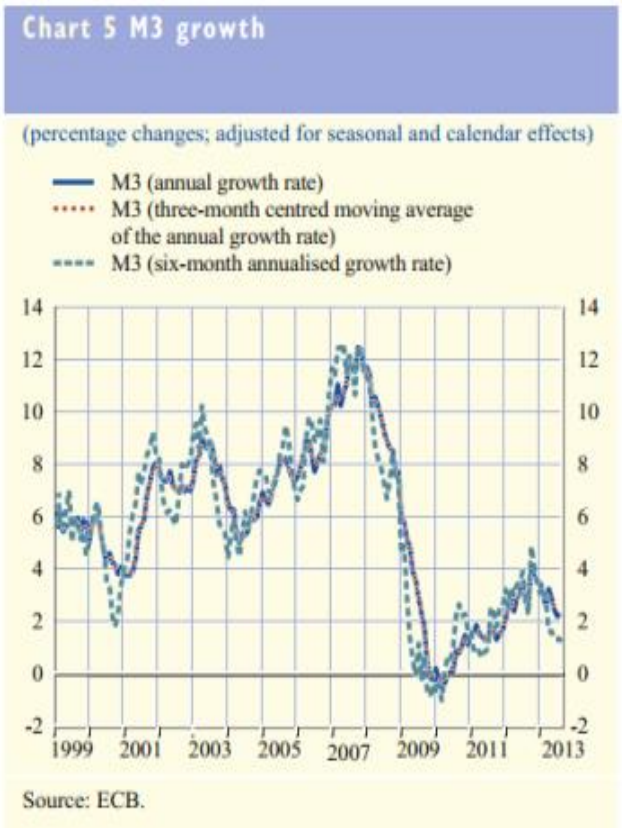
It can be seen how the loans requested by families are an advance of the situation that will have the GDP, with a drop of half a year that seems to indicate that the amount of loans granted to families can be used as good macroeconomic predictor to predict the situation that will have the economy in general and in particular the short-term GDP.

This relates to the previously mentioned about monetary aggregates, ie, the fact that families apply for loans and their grant is a positive factor to boost consumption and investment as well as a positive influential monetary aggregates from holding assets by financial institutions and households and a better long-term perspective. This provides a stable non-monetary market shocks and conducive to economic growth.

In turn, the loans earned by the companies follow the pattern made by the GDP also with a backward movement around about 6 months, which seems to indicate that the loans for families is a very important indicator and in turn, a very important factor for economy. The fact that this is a favorable factor, contributes to improve short term economy by increasing the GDP and long-term influence on loans earned by

companies, since the ease of obtaining loan from families, provides liquidity to traders improving the fluidity of both the M1 and the M3, which leads to increased consumption thanks to higher disposable incomes, greater short-term investment with the increase of loans granted to companies allowing greater inflow of foreign capital to the high expectations and a good development for the economy in terms of infrastructure, building jobs and innovation in technology by businesses.

In the following graph, the ECB tries to explain how monetary aggregates also serve as indicators of the evolution of GDP:



This is a graph in which it is clear the large reduction of monetary aggregates during the crisis, that is due to the failure of a large number of companies declared insolvent as well as its loans, the reduction of the entry of the outside capital because of the loss of credibility and trust of the foreign market and also, in general, the low remuneration of short-term deposits other than overnight deposits and negotiable instruments along with a reduction in risk aversion of investors has led the money-holding sector to transfer funds from monetary assets to underperforming assets riskier outside M3, looking for higher returns. This has been visible in the increase of the household investment in equity funds and fixed income securities in the first months of the year and, more recently.

4-Data analysis

In this section of the research, the removed data of the ECB will be analyzed, regarding the loans conceived by the economy of each country and in Europe, first to enterprises, and secondly to families, as well as the level of GDP with a quarterly time frame.

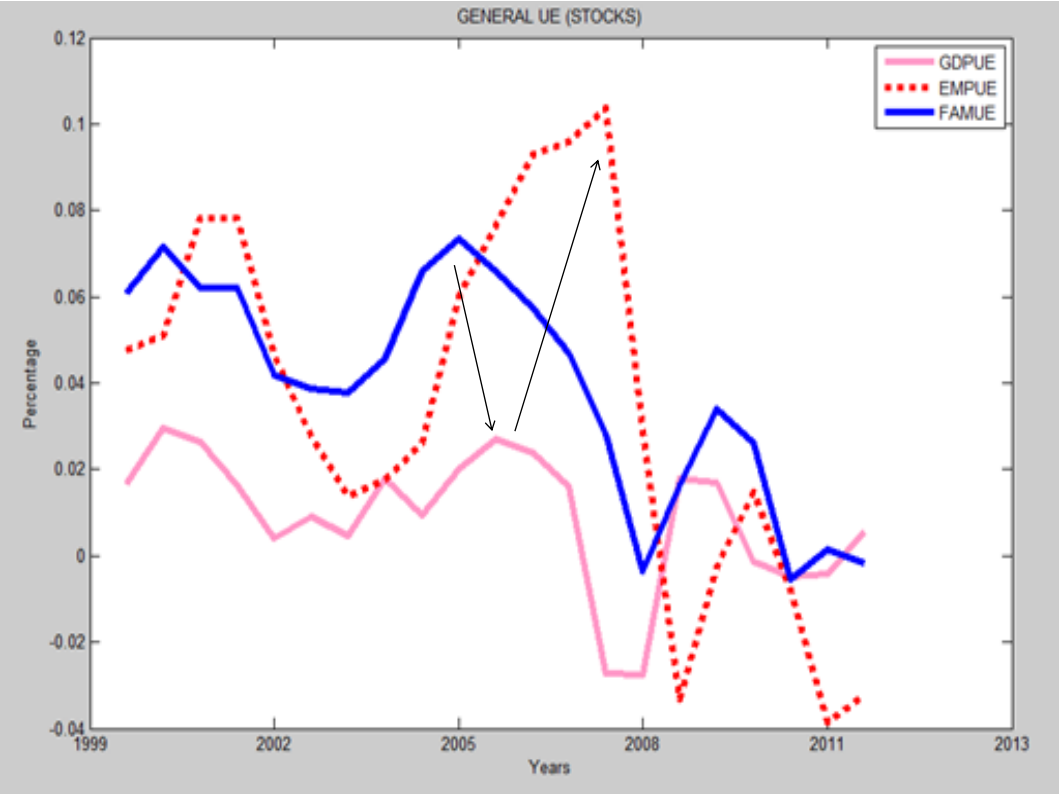
With this analysis, the aim is to verify whether loans granted to families is a preliminary indicator of the evolution of GDP, evaluating its delay, and GDP as a prior indicator of the development of loans granted to enterprises, and its delay.

In order to carry it out, we will use the obtained data with the MATLAB program for drawing graphs of quarterly periods of 2004 through 2013 in countries, and the 1999 through 2013 for Europe, dividing them into 3 types of graphs: the ones showing correlation with lags between GDP and loans granted to families, the ones showing the correlation with lags between loan companies and GDP, and a general graph showing the joint evolution during the period of loans granted to households, loans granted to enterprises and GDP to be the support for correlations.

Additionly in the analysis for countries, the GDP has been modificated has been modified by the difference model with loans to households for their conjunction in the general graphs countries

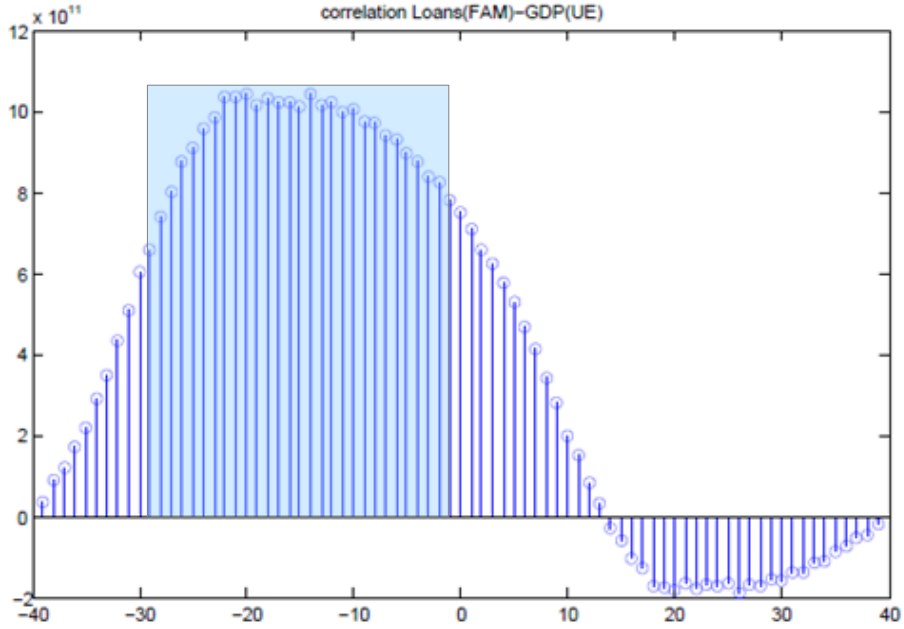
4-1 European

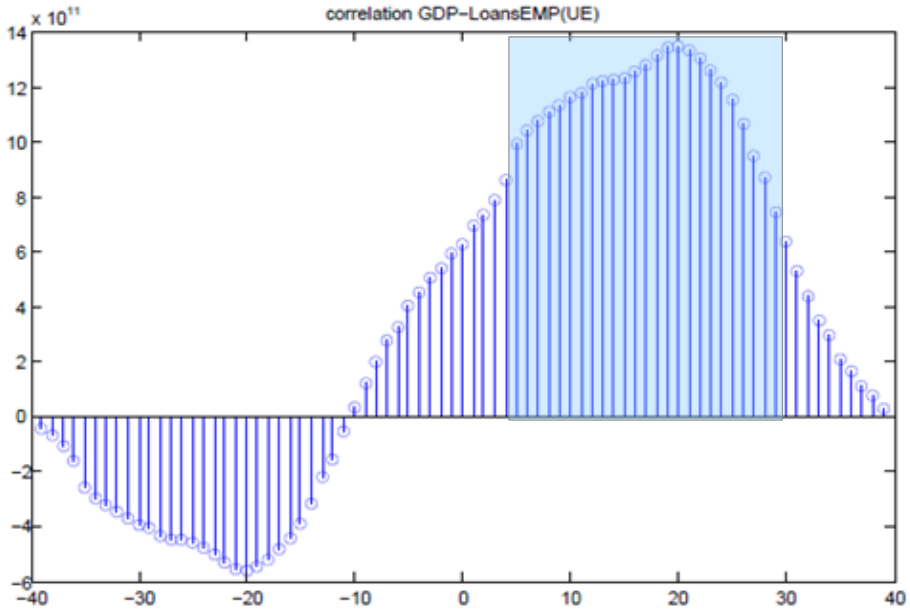
Firstly, we will analyze the whole of Europe by observing the graphs of GDP and loans, comparing with the previous paragraph first acquired by the ECB that made by the analysis of stocks, and next shown a personal study of financial flows.



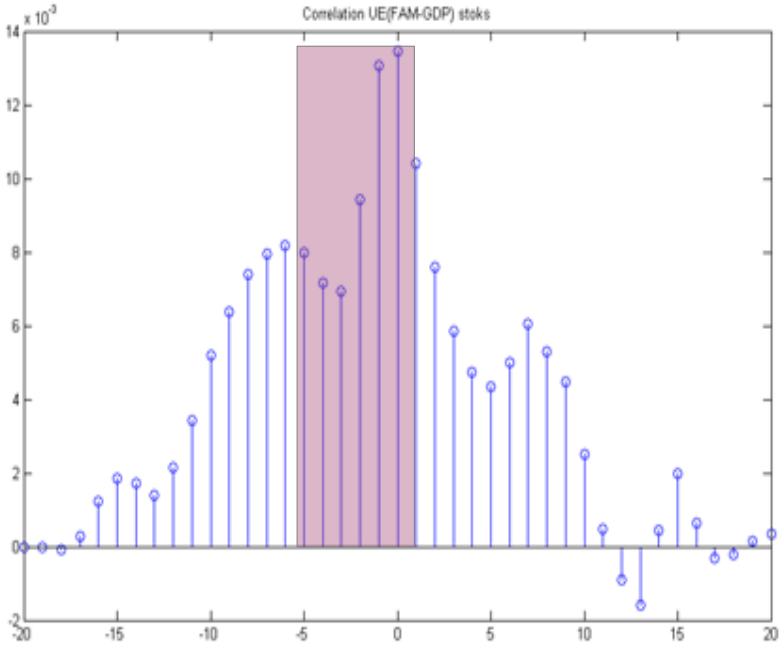
As for the delay indicator, the result is rather similar to the one obtained by the ECB, where there is growth until recession and subsequent crisis and then a new growth path with a prerequisite for the decline of loans granted to households in advance of the GDP of approximately 3 trimesters and a delay of loans granted to corporations between two to three trimesters of the graphics are quite obvious similarities but with more on volatility in one made with the MATLAB, this regards the analysis of stocks

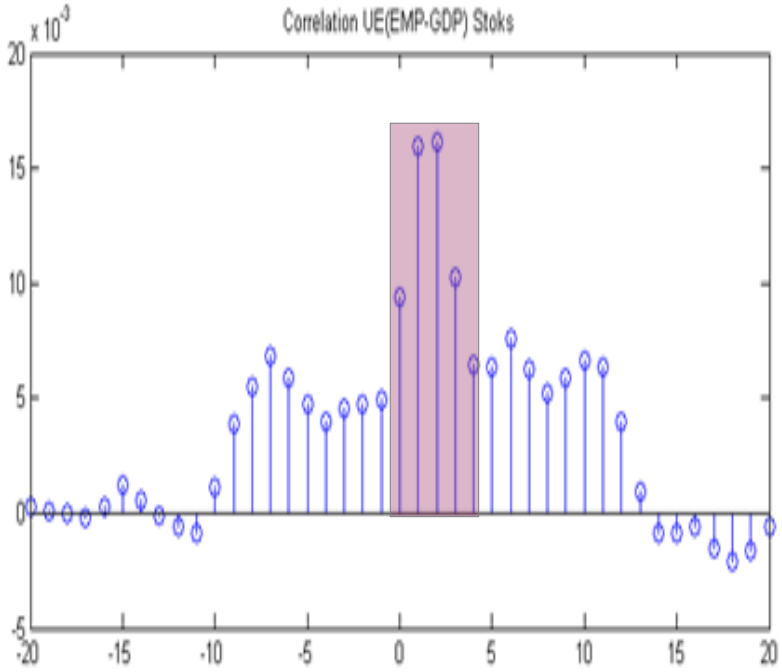
Regarding the correlation between loans and GDP, has been analyzed both financial flows and stocks, first by analyzing flows, there are also obtained data in conjunction with those obtained by the study of the ECB, with the above correlation found between about 2-3 previous trimesters when families loans, as it can be seen in the shading of the graph, lag concentration and on the part of GTP has in the subsequent 2-3 trimesters regarding the loans granted to companies, shown in the second graph with shading highlighting the concentration of the correlation, these results and the comparative will be analyzed in more detail in subsequent points together with their effects.





On the part of by analyzing of stocks, the correlation is as with the flow, but in this case the concentration is lower, as shown in the graphics shading





But, in a first view, it can be said that the results obtained by the study of the matlab and conducted by the ECB show very approximate results about the European Union as a whole.

4-2 By countries

The aim of this section is to try to analyze the data mentioned above, but this time by taking them individually the following countries: Germany, France, Italy and Spain.

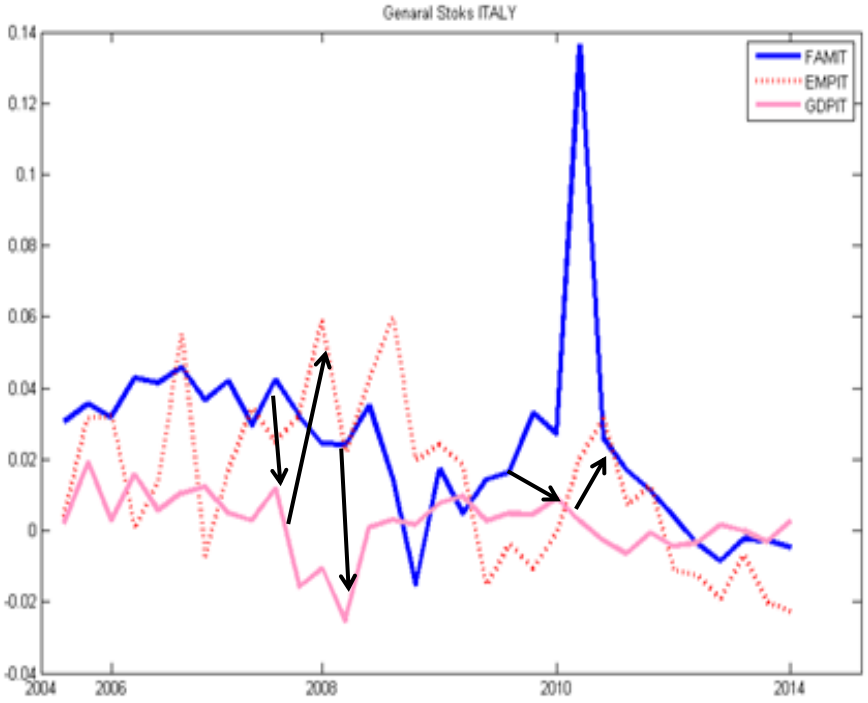
4.2.1 Italy

Firstly, this is the case of Italy In the first place,one explicacion of the variables in the joint graph of the three variables to be analyzed will be shown, being the gdpIT line, the GDP of Italy, famIT loans granted to families and empIT, which represents the loans granted to enterprises.

As it can be seen in the joint graph, as it happens in the general case: the economy grows sustainably by GDP until the prior to recession and crisis of 2007. This is possibly the clearest case in which the indicator, which is clearly seen as in the last trimester of 2007 and starts down the loans granted to families, and in the second trimester of 2008 the GDP does it as well as in the next trimester.

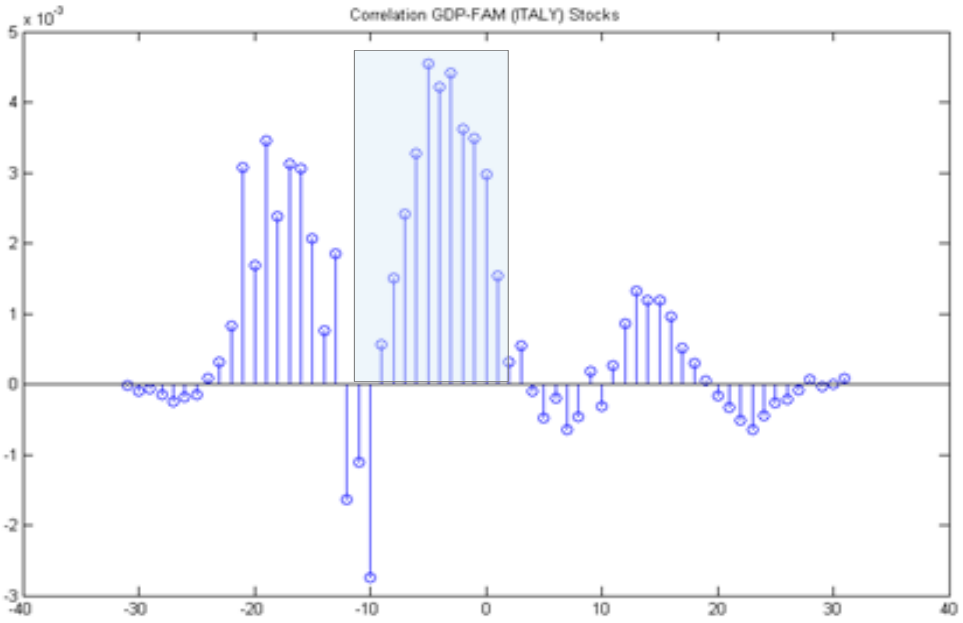
It begins to make clear the the loans granted to companies until mid-2009 as well as the first trimester of 2011 when it returns to be a further reduction of loans granted to households and beyond GDP and of loans granted to companies again; a new situation of recession whereby Italy was forced to seek a bailout to the IMF to obtain liquidity in the markets and in financial institutions and to re-boost the economy.

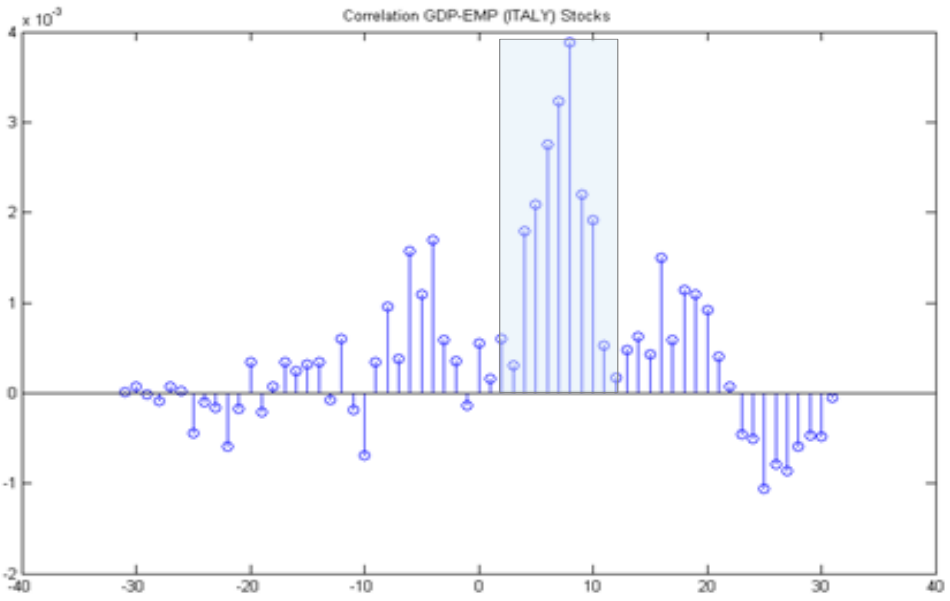
The graphic by d stocks:



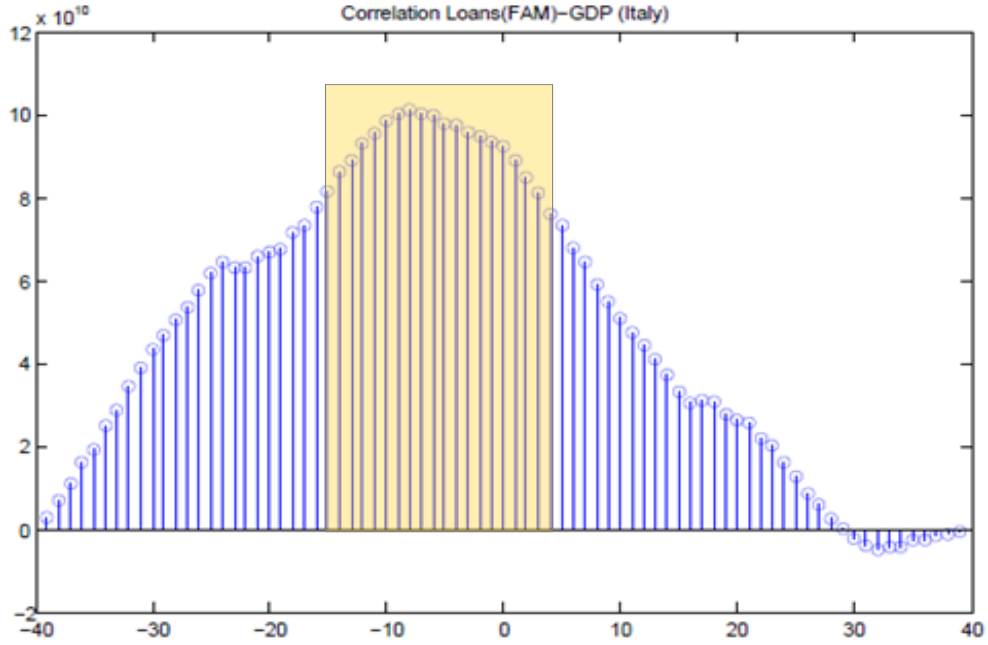
Regarding the correlation, will be made analysis a double set of financial flows and stocks on a case as Italy to see what happens as in Europe and coincide, firstly the case of flows, the loans granted to households with GDP in the following graph, it shows that if this correlation exists, a prior indicator of the situation that will undertake the GDP by the side of the evolution of loans granted to households as it is shown in highlighted box. This time, the correlation is clearer as to lag and it might be added that further in advance is that you can predict the evolution of the GDP with 2 or 3 quarterly ahead which is a great result of data analysis, it could be say if Italy is the most resembles the European model in terms of delays and correlation.

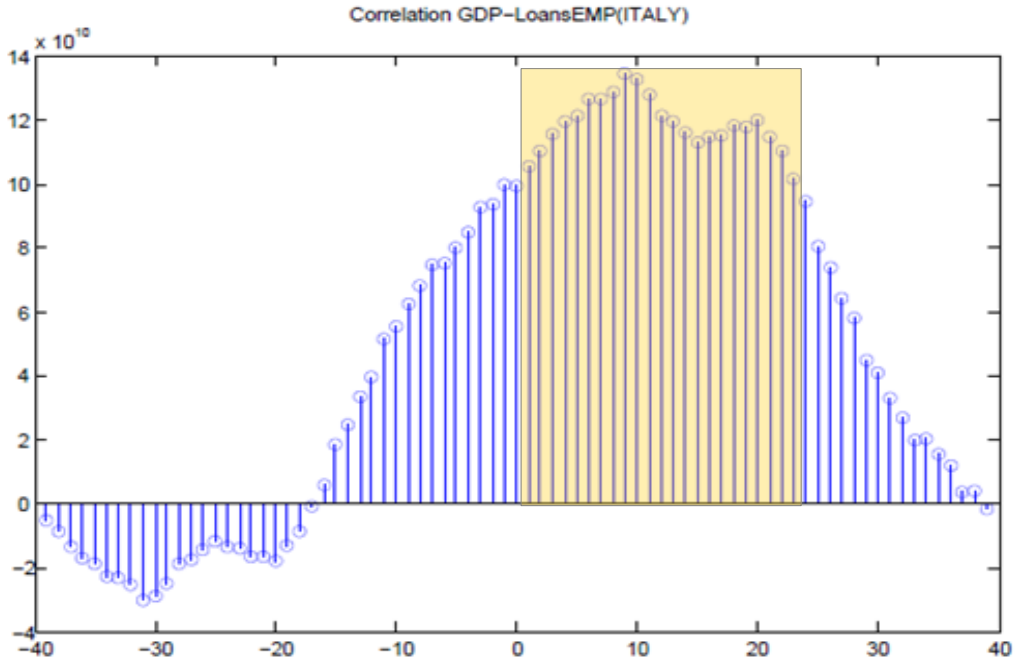
The correlation by stocks:





The correlation by flows:



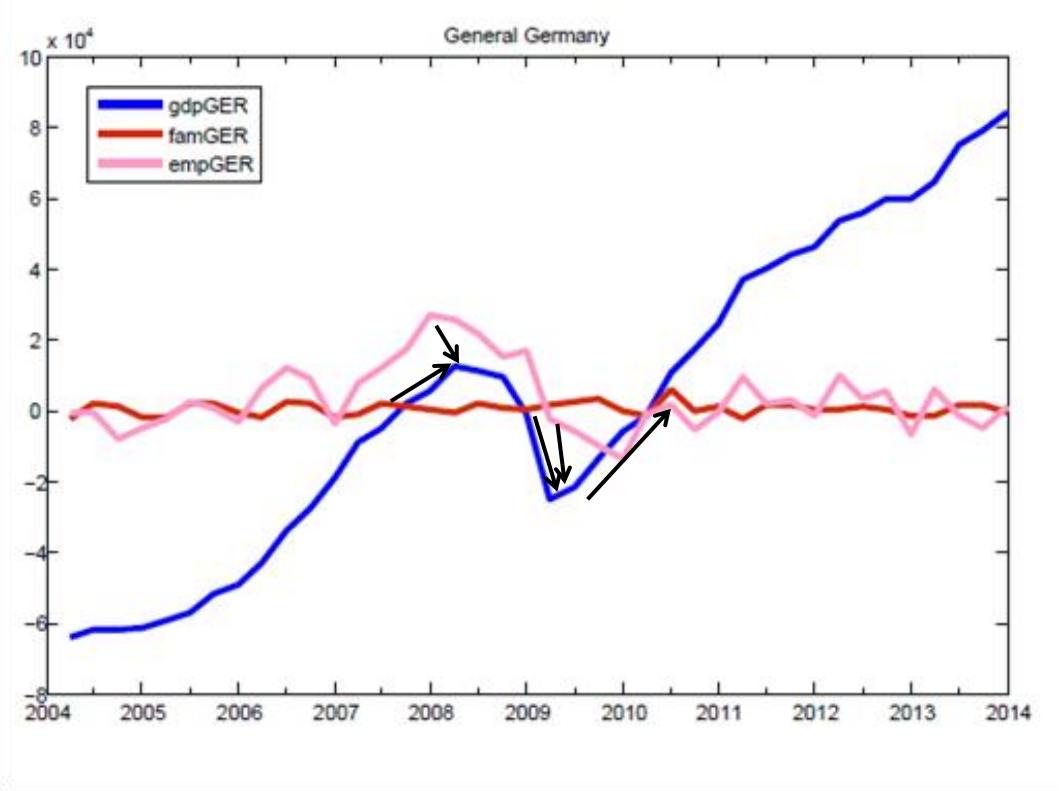


Secondly, the graph of correlation between GDP and loans conceived to enterprises. In the case of Italy, the results are also consistent with those expected by the ECB to analyze the European Union as a whole. In the graph we can see how a different delay in the shaded box is concentrated.

On the other part, the analysis of data the stocks, also it shows that if this correlation exists, in this case the correlation is more concentrated than the case of Europe, but in comparison with the case of the flows the correlation is less concentrated, so much in the part of correlation the loans of household to GDP, as the part of correlation the GDP to the loans of corporations.

4.2.2 Germany

Secondly, this is the case of Germany. In the first place, the joint graph of the three variables to be analyzed will be shown, being the gdpGER line, the GDP of Germany, famGER loans granted to families and empGER, which represents the loans granted to enterprises.



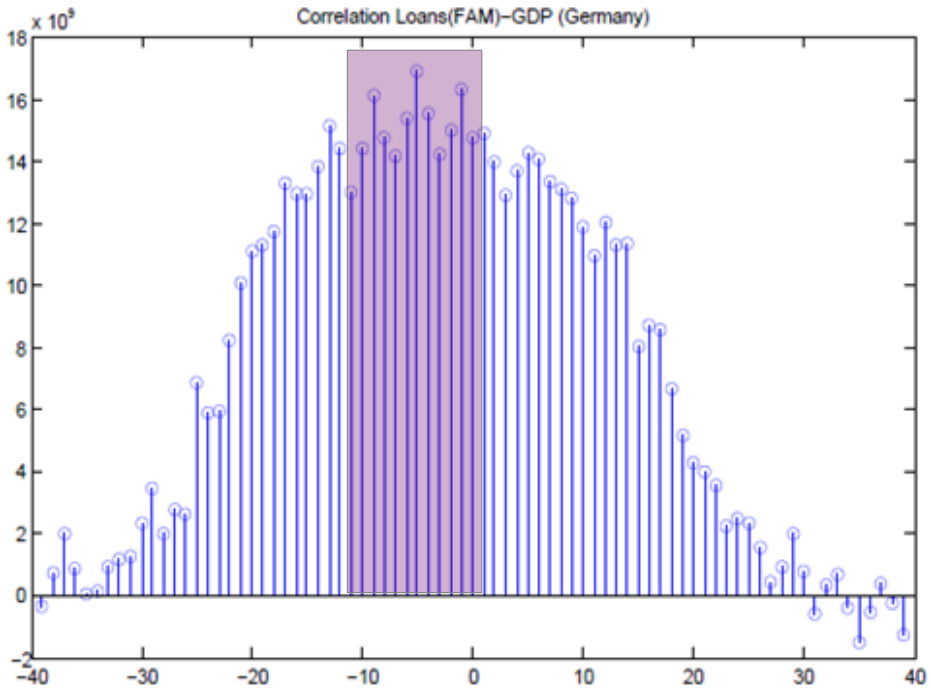
As it can be seen in mid-2007, the loan to families starts to decrease, causing that in early 2008 the GDP also begins to decrease as foresees the indicator while loans granted to enterprises begins to decrease in the last trimester of 2007 that means the advance of a trimester with respect to GDP. in this case the loans of corporations is previous than the GDP, but is the isolated situations that gives this analysis

Another phenomenon studied is given in this case, since the end of 2010, the loan of the families is observed positively and growing except in some period, and is reflected with a positive change of GDP in the first trimester of 2011, then, the large decreases in loans in the first trimester of 2011 were stopped by the recovery of the next months leading to the variation of the following trimester was not high but at least positive, entering in a dynamic time regarding loans both to companies and to families but in most cases within families of positive numbers.

While in the last trimester of 2013 a counterproductive data was given to the study because of the loans were higher than the previous periods but the growth was lower. In this case, it is due to actions of the state having already reached an annual growth of the 2% set by the European Union.

What implies that due to the characteristics of the German economy and the measures taken since the German economic crisis is already on the right track for sustainable growth.

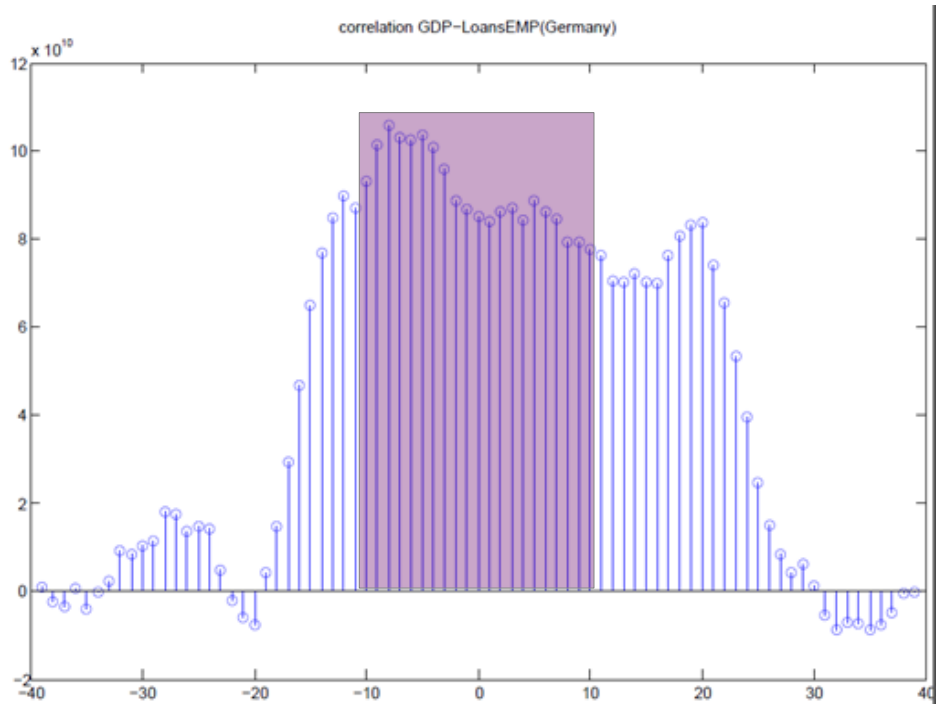
In the following graph, the correlation between loans and GPD families is shown:



As it can be seen in the correlation obtained by MATLAB, it shows the same or similar result to that obtained with the graphic, where the highest points of correlation are obtained in the shaded box between grade 1 and grade -5, which interprets that there are loans granted to families as a prior indicator between 2 and 3 trimesters that are

the periods analyzed and the variation that may arise will depending on the characteristics of the economy and its adopted measures as well as the economic environment which precedes it.

From the part of loans granted to companies, we will analyze their correlation with GDP in the following graph:

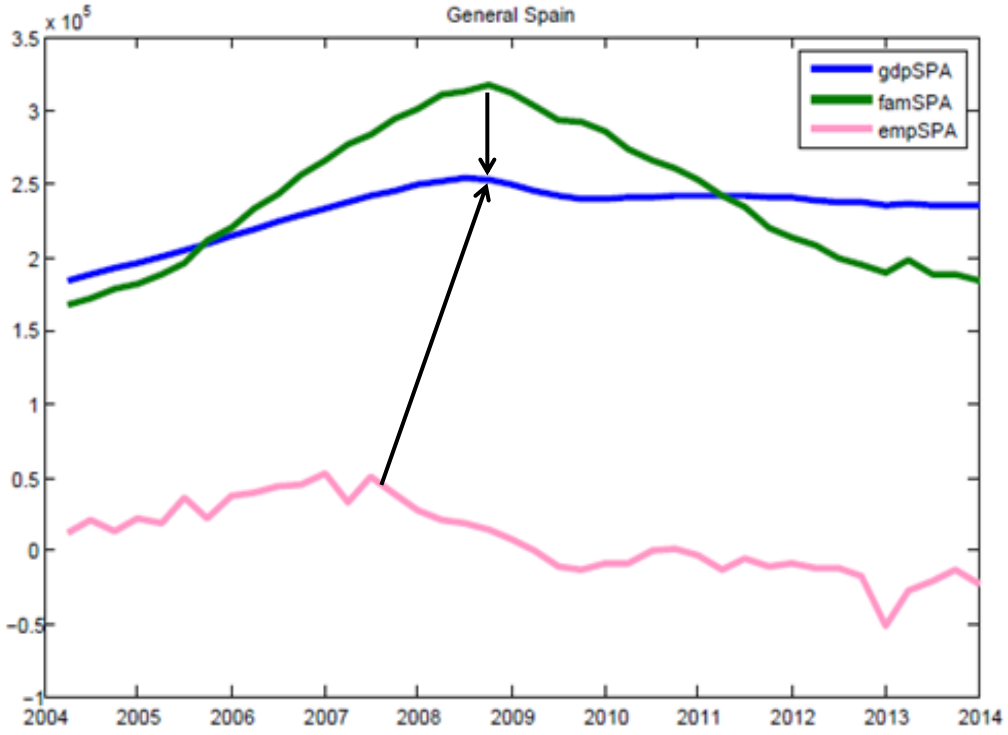


In this case, the result of the correlation does not work with the same effect as in the graph of the general data. In this correlation model, it shows that it has a high correlation but in this case regarding to the financing companies also intercepts the GDP as well as the loans granted to families but this with a little less in advance, which is a contradictory result from the expected. As it can be seen in the shaded box, this is due to the measures taken by the German government after the crisis later years to improve the conditions of loans granted to enterprises and their production facilities, to enhance competitiveness, investment, and development, besides the single case found in the analysis, could explain variations in loans and the differences between the general and the correlation graph.

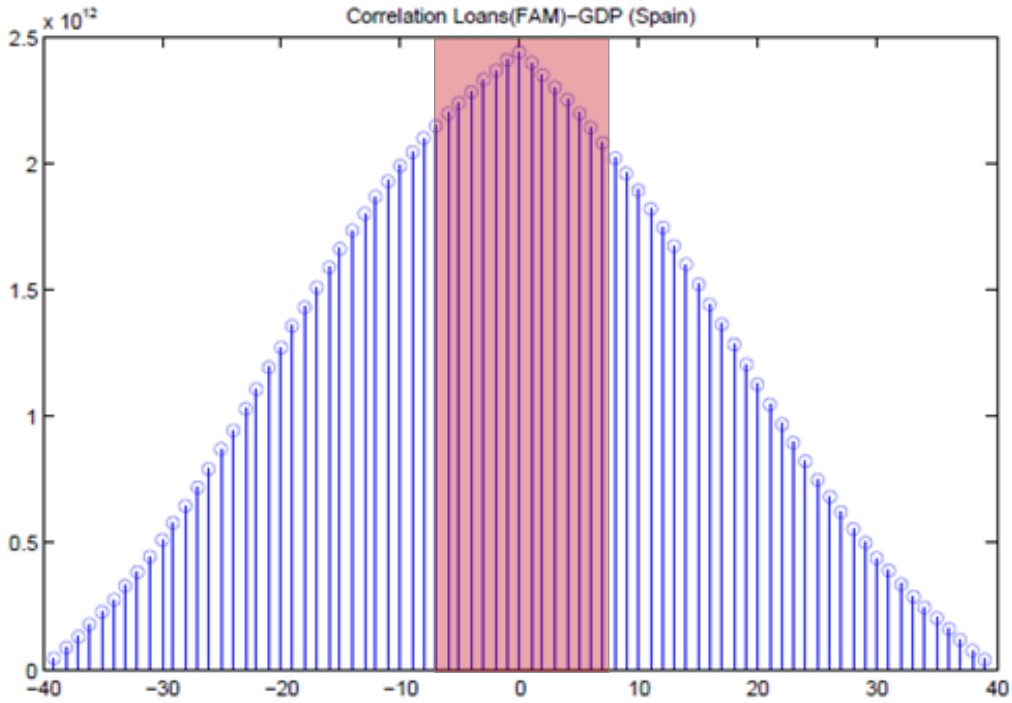
Therefore, in the German case does exist the loan factor for families as a prior indicator with GDP with an advance of approximately two trimesters, and in the case of loans granted to enterprises, it also complies it but with disparities in periods of effect.

4.2.3 Spain

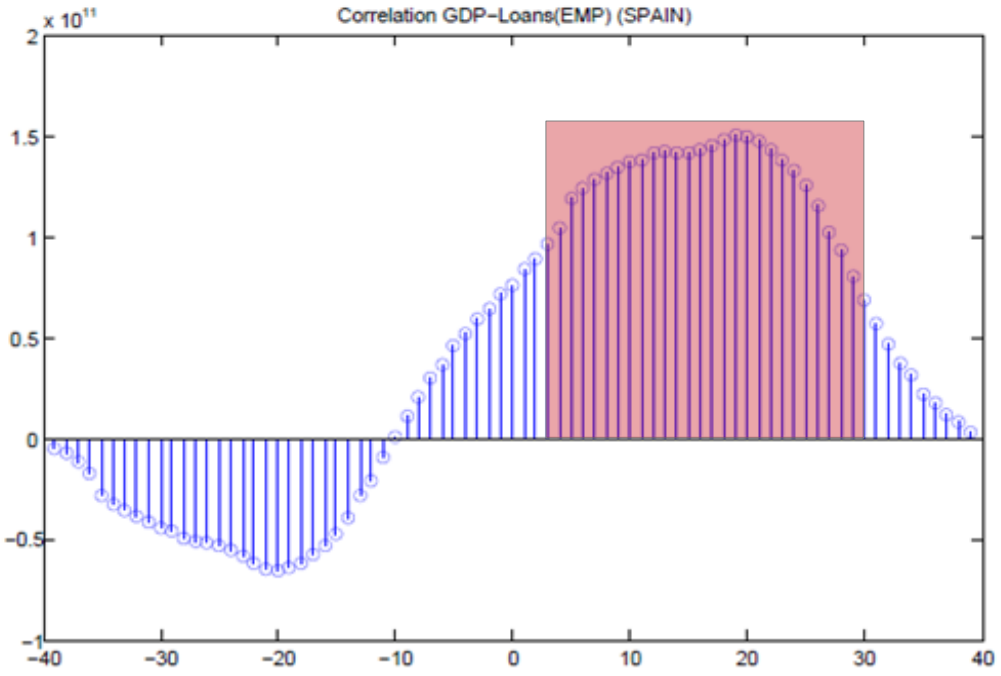
Regarding the case of Spain, it is the most atypical case since it is the only country where it seems there is no correlation or delay, often increase or decrease in the same time but they are in different amounts, at least regarding to the correlation between loans of families and GDP, that is due to the characteristics of the Spanish economy, its system of government, its financial system, and its fiscal policy.



This fact is supported even more with the obtaining of the above correlations above all in that of the loans granted to Households with the GDP where it is almost found a symmetric correlation, as it can be seen in the shaded box.



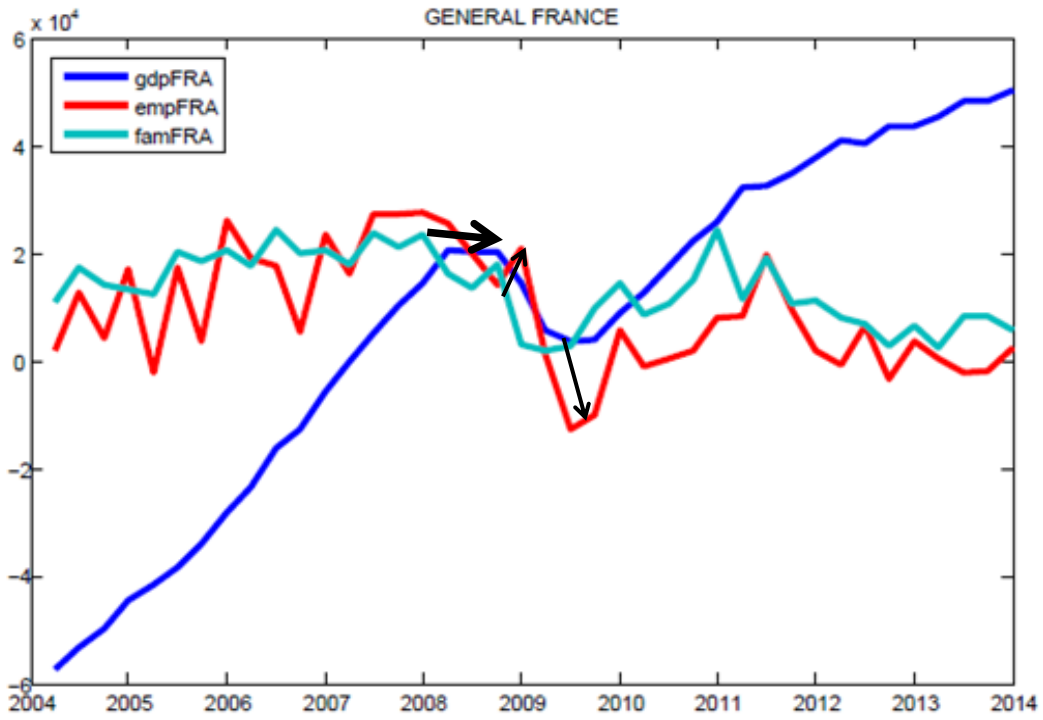
While in the second correlation with the companies it can be seen a concentration of delay with a similar meaning to the European average, as it can be observed in the shaded box, with which will be about two or three trimesters of delay in the evolution of GDP.



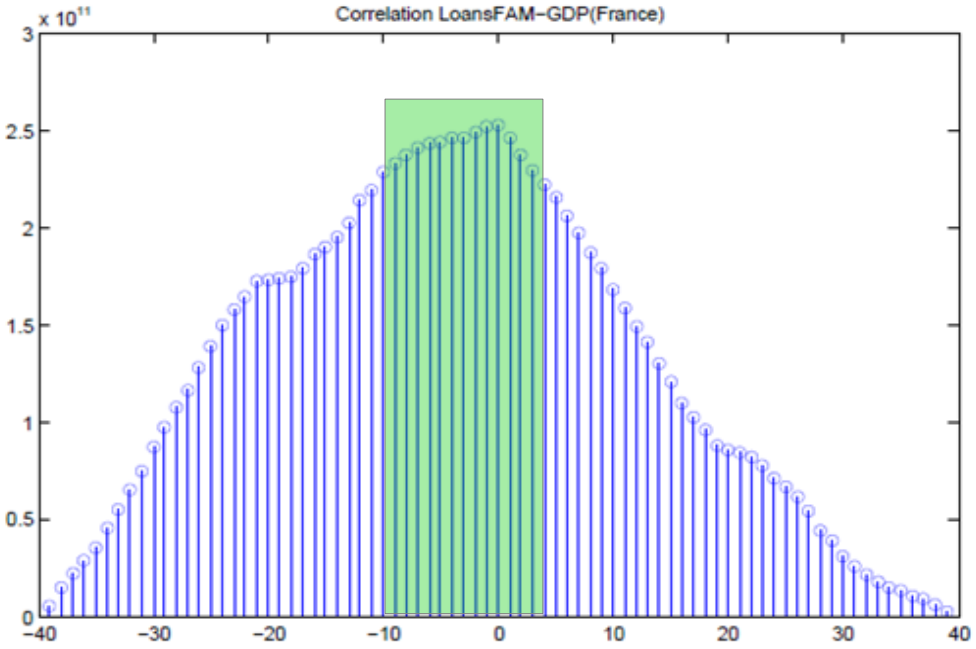
4.2.4 France

In the case France, it is again shown a link of previous indicator but in this case with much less advance than previous since the credits granted to families begin to decrease this time in the first trimester of 2008 and the GDP decreases in the second one. While companies does have something else in common with other countries because they have a delay of two periods of GDP appropriation conceived to enterprises.

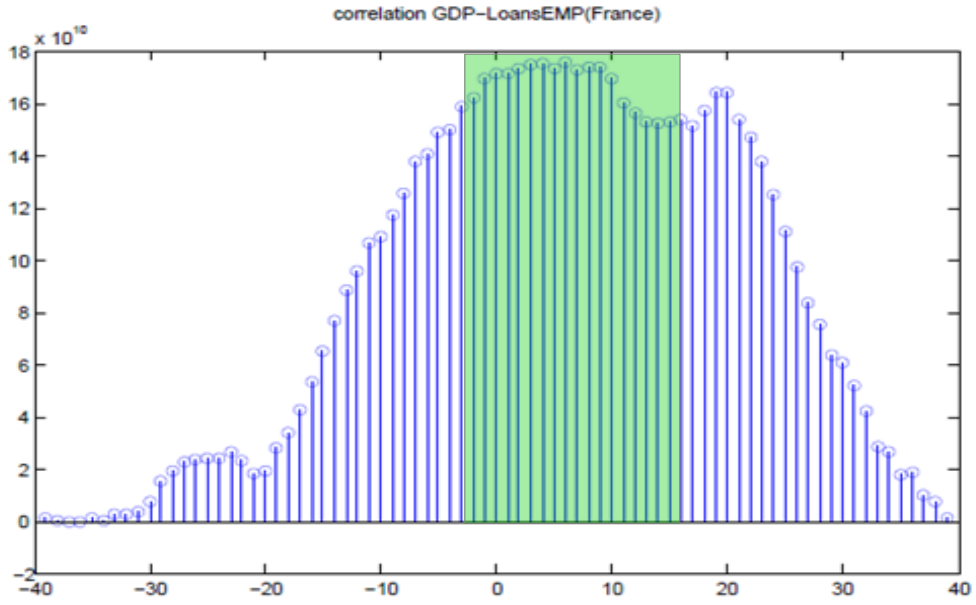
In the period beginning in the first quarter of 2010 also advancing the credits to families of GDP, with the bridle of her increase, and the decrease of the credits to companies shown, but in both cases with little temporal margin.



These results were better contrasted in graphics of correlation, where it is shown in the first correlation of loans granted to families with GDP, where it is effectively a prior correlation of loans. But unlike the rest, and as it could have seen in the general graph, this correlation is prior but tending towards the center, in other words, towards changes in the same time space, as it can be seen in the shaded box, hence it is only one trimester in general.



The same occurs with the correlation between GDP and loans granted to companies. The chart shows that there is a concentrated correlation with a delay of loans as it can be seen in the shaded box, being the GDP indicator, but more concentrated towards the center decreasing the temporal effect of the prediction, as it is shown in the general graph. Thus, both analysis agree that France is a country that is also satisfying the previous indicator of the loans, but unlike the rest of its temporary lower.



5-Consecuences and the explanation of correlation

The main consequence of this analysis is to establish as an indicator or strategy to be followed by the ECB as to have prior knowledge of the behavior of GDP and the evolution of economy to a prior correlation between loans granted to families with GDP and subsequent correlation of GDP with loans granted to enterprises.

The main motivation for obtaining this type of indicators is the performance of the ECB, since the main aim of it is price stability by two fundamental pillars, the amount of money in the market with an announcement of the quantitative reference value for the rate of a broad monetary aggregate, which is controlled by the monetary policy, and, in turn, it also controls the interest rate for it, and as the second pillar, it is an evaluation of the forecast of the behavior of prices and risks to price stability in the euro area as a whole, based on a broad set of indicators or macroeconomic variables. But it also has other objectives which may not be inconsistent with the rest. The other objectives are: to support the general economic policies, as would be the encouragement of sustainable non-inflationary growth, and a high growth of employment and social protection.

Therefore, the ECB is always conducting researches to find indicators to guide its monetary policy to get that price stabilization. They rejected the exchange rate due to the large area of the EU that could generate inconsistency, and also the interest rate because of the difficulty of finding a consistent balance, the nominal income because it created some uncertainty on inflation and monetary aggregates either because they created uncertainties about the demand for money.

The inflation indicator was chosen based on the fact that its evolution in the past provided the market with a clear guide to future price developments, hoping that ,as a benefit of that price transparency, will increase, as well as the competition, innovation and investment consumption.

Therefore, this new indicator would be a great advance for the elaboration of the monetary policy to stabilize prices.

Because, on the one hand, in terms of the correlation between the loans for companies and the GDP, the fact of being a previous indicator average 2 trimesters in advance in the European Union and most countries consists of these, if the ECB saw that these loans begin to decrease, it would have a short-term temporary space to take action and to avoid the fall of GDP or at least to slow it down, as it would be an expansionary fiscal policy by lowering taxes if both are direct, near the time of contribution, and indirect, to reduce their expenses and have more disposable income and thus somehow compensate for the lack of liquidity that provides consumption.

As for the other correlation, the case is similar to the ECB to see that the GDP begins to decline in most cases in terms of countries and the EU as a whole will have two trimesters until the loan granted to companies start to decrease. Due to all of this, the ECB can make different measures, as in the previous case of being close to the distribution of profits and payment of corporate tax, may temporarily reduce both corporation tax and the percentage allocated to reserves.

Another measure that could palliate the effect would be to reduce the interest rate for more lending facility and to invest money into the banks to take lending. This last measure has been recently taken by the ECB, expected to enhance investment and consumption and sustainable economic growth.

Therefore, against potential disruptions thanks to all the correlations that form this indicator media, the ECB would have a year to take action before completing the cycle of the two effects: the first two trimesters of the correlation and the two trimesters of second correlation, since the cycle of the observed effect on the economy would be far more damaging, since a decline of the loan granted to households, low investment, consumption, disposable income, production and consequently the GDP, and declining loan of the companies also decrease production, competitiveness, investment, it would increase unemployment and the risk of bankruptcy of certain entities, exports would decrease. With all these factors as a group, the situation would enter in a cycle where families and then the GDP and again the loans granted to companies aggravating the situation as it would happen in the crisis, but taking appropriate measures to avoid that cycle could even get to the second correlation performed.

Another important feature that would bring this indicator would be a picture of an economy with less risk of long-term negative shocks and greater international credibility, since the increase in the international credibility favors a decrease of non-

monetary shocks, which cannot be controlled by monetary policy, as it would be the entry of foreign financial capital or the exportations among others. These perturbations can generate price volatility, so the increase of this factor of credibility through the use of the indicator will decrease nonmonetary disturbances.

The ECB has formulated various theories to try to explain these phenomena, especially in delay of enterprises financing when GDP decreases. This decrease of the loans, as the ECB claims, is that the companies when the economy enters a cycle recession or crisis, they prefer, before obtaining financing, to use their own resources as would the reserves, accumulated capital or the sale of some assets to be financed. That is because, in those periods, their goal is to try to keep performing its functions while minimizing risk and one way to do it is without indebtedness.

Another point of view that could explain this phenomenon is that, during the times of crisis or recession, many companies are evoked to the crisis because of insolvency, big reduction of income by large companies causing them losses that exceeds the measures and provisions that companies have, caused the insolvencies and the dissolution of these, among other reasons, these companies becoming insolvent and affecting its liabilities which are normally financed through banks. These banks insolvencies will affect banks in a way that much of their assets will not get to collect their balance being affected negatively, and causing them to be more risk averse to lend loans to most businesses until the time of crisis passes. This policy of action by the banking market favors a reduction of the loans, preventing the companies that are on the verge bankruptcy, cannot be solved with loans and again enters another cycle of increased bankruptcy risk-reduction credit deleveraging, which generates a lot of controversy in the economy.

Moreover, there would be another possible explanation regarding to the reserves that should keep both businesses and financial loan institutions. To calculate the percentage of stocks, you have to have both the number of assets held and the risk these precede to make into money easily, that is to say, liquidity.

The problem is that, during the crisis period and the previous one, risk rating agencies qualify very high risk assets with a low risk rating, as in the case of toxic assets and the controversial case of subprime mortgages. These differences of rating usually

influenced by economic reasons for both rating agencies and issuers, produced a lot of assets that had a lot of risk and also distributed worldwide. With the above mentioned, the ignorance of this risk caused a failure in the development of the level of reserves to cover the risk of the assets by reserves or by social capital, which made that when the real estate bubble exploded, many companies go bankrupt due to the possession of those toxic assets and to the ignorance for not having sufficient resources to cope with their losses, causing bankruptcies of large companies both companies and the banking sector, generating that way the negative economic cycle discussed above between loans granted to households and loans granted to companies that finally led to a major crisis and to a greater distrust of banks.

Then, when granting loans, where now assess the risks much more when conceiving a loan especially when there are contradictions in GDP explaining the correlation mentioned above.

6- Conclusions

Regarding this new indicator for macroeconomics, quite significant results have been obtained.

Firstly, a greater number of causes and consequences to those provided by the ECB have been obtained, since this explains the correlation through the claim that the companies, when the economy goes into a cycle of recession or crisis, prefer, before obtaining funding, to draw on their own resources, whereas with this study have also been provided first, when there are insolvencies by companies, it affects the bank assets reducing and generating them less liquidity to grant credits, as well as being more risk averse. The ignorance of the risk causing a major financial crisis, has now made that banks assess much more the risks and that it is more difficult to get a loan.

Secondly, very similar results to those obtained in the study made by the ECB have been obtained, which is a positive result to have the backing of the ECB study on the outcome of the study results.

Thirdly, the final confirmation of this indicator as a possible preventive measure of the ECB as a measure for the elaboration of a monetary policy in depending on the indicator to maintain the sustainability in prices, which is given with confirmation of the data analysis, which, in the future, can be very important if it is possible to manage the optimal among the possible measures mentioned above, would be a different distribution of benefits, may temporarily reduce both corporate tax and the percentage allocated to reserves.

Another action that would palliate the effect, regarding companies, would be to reduce the interest rate for more lending facility and to pump money into the banks to take lending. Regarding families, a tightening fiscal policy lowering taxes both direct and indirect, to reduce their expenses and to have more disposable income and thus, somehow, to compensate the lack of liquidity that provides consumption.

These measures would be a clear example of that would have a wider variety when choosing the ECB that could be adapted according to what the market demands in the time of crisis or recession.

Fourthly, although in some cases such as that of Spain has not been given the best results as in the rest of the EU countries or in whole, it is due to the great variety in the countries, in which the effect in some is almost the same level as that of Europe, as it would be the case of Germany or France, and some in which the correlation is further accentuated is the case of Italy.

This leads to this disparity but with a large majority in the path of optimal, makes the important whole EU factor, as it is the study used for the implementation of monetary policy, but that if any country that would like to do some individual study for a more adaptation to fiscal policy that, in most cases, would get a significant factor different to the European but approximated, which would serve it to make better decisions about its fiscal policy.

Fifthly, after the completion of the study, it should be made a more comprehensive financial control system, since it has been the main problem of the crisis and to keep a better track of it, as explained above, would prevent that happen correlations and thus, to avoid the negative cycle of inadequate funding.

To solve this problem, the possibility of creating a common financial system has been raised. It is to avoid decentralization and to have a more thorough control not only of monetary policy through the money supply and the interest rate, but also to control the lending and liquidity in the market, in which when there is less liquidity in the market for a higher level of reserves, the ECB get more control over the interest rate as well as a centralized risk assessment of loans granted to enterprises.

This would be a very interesting measure to take as much of the changes that happen in the power of the ECB are those that need to centralize for better confrontation against disturbances of loans granted to families and companies. But many countries are against since they have given up an independent monetary policy. Now, to also give up an independent fiscal policy would leave very little room for maneuver on the part of each country and would depend on the vast majority of all measures taken by the ECB, which is not always the most optimal for each country due to the circumstances, and that still does not take that step to have some maneuverability action by each country individually.

Therefore, the result has been satisfactory and would have to try real basis or on a thorium program simulates the proposed measures to see if the effect arises desired, and thus, try to convince other countries to establish a common financial system that would be very beneficial for efficient action against the results that have given the analysis of the data.

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